

MURATA Hi-Cap Multilayer Ceramic Chip Capacitors



Hi-Cap: The Murata hi-cap, tantalum replacement product lineup is available in X7R, X6S, X7S, and X5R with capacitance of 1µF and larger. This line of high volumetric capacitance ceramic chip capacitors is available in 4V, 6.3V, 10V, 16V, 25V, and 50V. This product series (GRM) is offered with a nickel (Ni) barrier termination plated with tin (Sn), and is RoHS compliant. Stringent dimensional tolerances allow highly reliable, high-speed automatic chip placement on PCBs.

Why use ceramic chips over tantalum and aluminum capacitors? Ceramic chips offer better reliability, performance, no polarity, and allow design engineers to downsize designs with various package options from 0402 X5R 1µF to 1210 X5R and X6S 100µF. This line of high volumetric multilayer capacitance ceramic chip capacitors (MLCC) has excellent high frequency noise absorption performance compared to tantalum and aluminum caps. For bypass/decoupling applications, MLCC is equivalent to 1/2 to 1/5 the capacitance value of a tantalum capacitor because impedance (ESR) of MLCC is lower at higher frequencies, above 100kHz. Consider Murata hi-cap as your tantalum capacitor replacement.

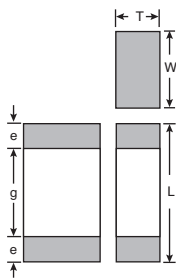


This product is RoHS compliant. **Recommended Capacitance of MLCC for Tantalum Cap. Replacement**

Depending on the operating frequency, MLCC is equivalent to 1/2 to 1/10 capacitance value of tantalum cap. Because impedance (ESR) of MLCC is lower than tantalum cap. Refer to the impedance curve graph below.

Tantalum Cap.
1µF
2.2µF
4.7µF
10µF
22µF
47µF
100µF
220µF

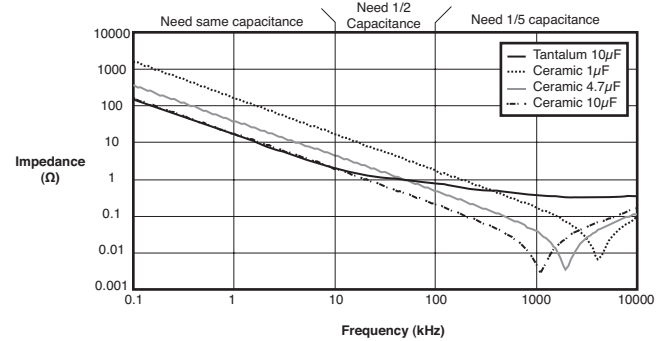
MLCC Recommended Cap.
0.1 to 0.47µF
0.22 to 1µF
0.47 to 2.2µF
1 to 4.7µF
2.2 to 10µF
4.7 to 22µF
10 to 47µF
22 to 100µF



RoHS Compliant

Impedance Curve of MLCC

It is important that capacitor's impedance is lower at ripple noise frequency.



Murata Ceramic Caps, SMD

Part No.	DIMENSIONS: mm				
	L	W	T	e Min.	g Min.
GRM155	1.0±0.05	0.5±0.05	0.5±0.05	0.15 to 0.35	0.3
GRM188	1.6±0.1	0.8±0.1	0.8±0.1	0.2 to 0.5	0.5
GRM219	2.0±0.1	1.25±0.1	0.85±0.1	0.2 to 0.7	0.7
GRM21B			1.25±0.1		
GRM319	3.2±0.15	1.6±0.15	0.85±0.1	0.3 to 0.8	1.5
GRM31M			1.15±0.1		
GRM31C	3.2±0.2	1.6±0.2	1.6±0.2	0.3	1.0
GRM32C			1.6±0.2		
GRM32D	3.2±0.3	2.5±0.2	2.0±0.2	0.3	2.0
GRM32E			2.5±0.2		
GRM32M	3.2±0.3	2.5±0.2	1.15±0.1	0.3	1.0
GRM32N			1.35±0.15		
GRM32R	4.5±0.4	3.2±0.3	1.8±0.2	0.3	2.0
GRM43E			2.5±0.2		
GRM43S	5.7±0.4	5.0±0.4	2.8±0.2	0.3	2.0
GRM55E			2.5±0.2		
GRM55R			1.8±0.2		

0402 Case Size

MOUSER STOCK NO.	Murata Part No.	Value (µF)	Volt (DC)	Tol.±	Temperature Coefficient	Price Each				Reel Quantity	Price per Piece
						1	50	100	500		
81-GRM155R60J105KE19	GRM155R60J105KE19D	1.0	6.3	10%	X5R	.06	.04	.038	.022	10000	.006
81-GRM155R61A105KE15	GRM155R61A105KE15D	1.0	10	10%	X5R	.07	.05	.043	.025	10000	.011
81-GRM155F50J105ZE01	GRM155F50J105ZE01D	1.0	6.3	+80% -20%	Y5V	.05	.03	.027	.016	10000	.007

0603 Case Size

MOUSER STOCK NO.	Murata Part No.	Value (µF)	Volt (DC)	Tol.±	Temperature Coefficient	Price Each				Reel Quantity	Price per Piece
						1	50	100	500		
81-GRM188R70J105KA01	GRM188R70J105KA01D	1.0	6.3	10%	X7R	.30	.18	.11	.094	4000	.057
81-GRM188R71A105KA61	GRM188R71A105KA61D	1.0	10	10%	X7R	.31	.26	.18	.106	4000	.052
81-GRM188R71C105KA12	GRM188R71C105KA12D	1.0	16	10%	X7R	.31	.26	.18	.106	4000	.052
81-GRM185R60J105KE21	GRM185R60J105KE21D	1.0	6.3	10%	X5R	.17	.08	.079	.072	4000	.067
81-GRM39R105K6.3	GRM188R60J105KA01D	1.0	6.3	10%	X5R	.14	.06	.036	.016	4000	.008
81-GRM185R61A105KE36	GRM185R61A105KE36D	1.0	10	10%	X5R	.15	.11	.088	.051	4000	.023
81-GRM39R105K10	GRM188R61A105KA61D	1.0	10	10%	X5R	.18	.06	.036	.021	4000	.009
81-GRM185R61C105KE44	GRM185R61C105KE44D	1.0	16	10%	X5R	.15	.11	.088	.051	4000	.023
81-GRM39R105K16	GRM188R61C105KA93D	1.0	16	10%	X5R	.07	.05	.044	.025	4000	.009
81-GRM188R61E105KA12	GRM188R61E105KA12D	1.0	25	10%	X5R	.08	.06	.051	.029	4000	.013
81-GRM39Y105Z10D	GRM188F51A105ZA01D	1.0	10	+80%-20%	Y5V	.10	.04	.028	.013	4000	.006
81-GRM188F51C105ZA01	GRM188F51C105ZA01D	1.0	16	+80%-20%	Y5V	.10	.04	.028	.016	4000	.007
81-GRM188F51E105ZA12	GRM188F51E105ZA12D	1.0	25	+80%-20%	Y5V	.07	.05	.042	.024	4000	.011
81-GRM188R71A225KE15	GRM188R71A225KE15D	2.2	10	10%	X7R	.41	.30	.22	.12	4000	.057
81-GRM185R60J225KE26	GRM185R60J225KE26D	2.2	6.3	10%	X5R	.17	.13	.10	.058	4000	.026
81-GRM18R60J225KE19D	GRM188R60J225KE19D	2.2	6.3	10%	X5R	.33	.24	.20	.159	4000	.021
81-GRM188R60J225KE01	GRM188R60J225KE01D	2.2	6.3	10%	X5R	.40	.17	.104	.06	4000	.029
81-GRM188R61A225KE34	GRM188R61A225KE34D	2.2	10	10%	X5R	.17	.13	.10	.058	4000	.022
81-GRM188R61C225KE15	GRM188R61C225KE15D	2.2	16	10%	X5R	.18	.14	.108	.062	4000	.03
81-GRM18F50J225ZE01D	GRM188F50J225ZE01D	2.2	6.3	+80%-20%	Y5V	.11	.08	.065	.037	4000	.017
81-GRM188F51A225ZE01D	GRM188F51A225ZE01D	2.2	10	+80%-20%	Y5V	.11	.08	.065	.037	4000	.017
81-GRM18R60J475KE19D	GRM188R60J475KE19D	4.7	6.3	10%	X5R	.16	.14	.085	.049	4000	.024
81-GRM188F50J475ZE20	GRM188F50J475ZE20D	4.7	6.3	+80%-20%	Y5V	.12	.09	.074	.042	4000	.021
81-GRM188F51A475ZE20	GRM188F51A475ZE20D	4.7	10	+80%-20%	Y5V	.12	.09	.074	.042	4000	.021
81-GRM188R60G106ME47	GRM188R60G106ME47D	10	4	20%	X5R	.63	.56	.377	.217	4000	.081
81-GRM188R60J106ME47	GRM188R60J106ME47D	10	6.3	20%	X5R	.63	.56	.377	.217	4000	.06
81-GRM188R60G226ME0L	GRM188R60G226ME0L	22	4	20%	X5R	.26	.20	.18	.17	4000	.06

0805 Case Size

MOUSER STOCK NO.	Murata Part No.	Value (µF)	Volt (DC)	Tol.±	Temperature Coefficient	Price Each				Reel Quantity	Price per Piece
						1	50	100	500		
81-GRM40X105K10L	GRM21BR71A105KA01L	1.0	10	10%	X7R	.11	.10	.063	.037	3000	.018
81-GRM40X105K16K	GRM21BR71C105KA01K	1.0	16	10%	X7R	.15	.10	.063	.036	10000	.015
81-GRM40X105K16L	GRM21BR71C105KA01L	1.0	16	10%	X7R	.15	.10	.063	.036	3000	.017
81-GRM21BR71E105KA99	GRM21BR71E105KA99L	1.0	25	10%	X7R	.20	.16	.12	.067	3000	.027
81-GRM21F51C105ZA01D	GRM219F51C105ZA01D	1.0	16	+80% -20%	Y5V	.07	.05	.043	.025	4000	.013
81-GRM40Y105Z16L	GRM21BF51C105ZA01L	1.0	16	+80% -20%	Y5V	.11	.08	.06	.05	3000	.029
81-GRM21F51E105ZA01D	GRM219F51E105ZA01D	1.0	25	+80% -20%	Y5V	.07	.05	.043	.025	4000	.013
81-GRM21F51H105ZA12L	GRM21BF51H105ZA12L	1.0	50	+80% -20%	Y5V	.10	.09	.06	.034	3000	.017
81-GRM21R60J225KA01L	GRM21BR60J225KA01L	2.2	6.3	10%	X5R	.21	.16	.124	.056	3000	.027
81-GRM21R61C225KA88L	GRM21BR61C225KA88L	2.2	16	10%	X5R	.26	.22	.155	.089	3000	.041
81-GRM219R61C225K88D	GRM219R61C225K88D	2.2	16	10%	X5R	.50	.43	.32	.159	4000	.077
81-GRM219R61E225K	GRM219R61E225K1A12D	2.2	25	10%	X5R	.49	.35	.275	.155	4000	.076
81-GRM21R60J226ME39L	GRM21BR60J226ME39L	2.2	6.3	20%	X5R	.40	.30	.171	.115	3000	.058
81-GRM21BR71A225KA01L	GRM21BR71A225KA01L	2.2	10	10%	X7R	.19	.15	.114	.066	3000	.027
81-GRM21BR71C225KA12L	GRM21BR71C225KA12L	2.2	16	10%	X7R	.29	.24	.21	.121	3000	.058
81-GRM21BR71E225KA73L	GRM21BR71E225KA73L	2.2	25	10%	X7R	.38	.25	.22	.131	3000	.11
81-GRM40Y5V225Z010AL	GRM21BF51A225ZA01L	2.2	10	+80% -20%	Y5V	.23	.11	.07	.04	3000	.02
81-GRM40Y5V225Z016AL	GRM21BF51C225ZA01L	2.2	16	+80% -20%	Y5V	.23	.11	.065	.037	3000	.018
81-GRM40Y225Z25L	GRM21BF51E225ZA01L	2.2	25	+80% -20%	Y5V	.13	.10	.08	.05	3000	.02
81-GRM21BR60J335K	GRM21BR60J335KA11L	3.3	6.3	10%	X5R	.58	.41	.34	.20	3000	.08